SERVICE INFORMATION

IN400
AV CONTROLLER

CONTENTS:

OPERATION MANUAL

SCHEMATIC DIAGRAMS

TEST PROCEDURE

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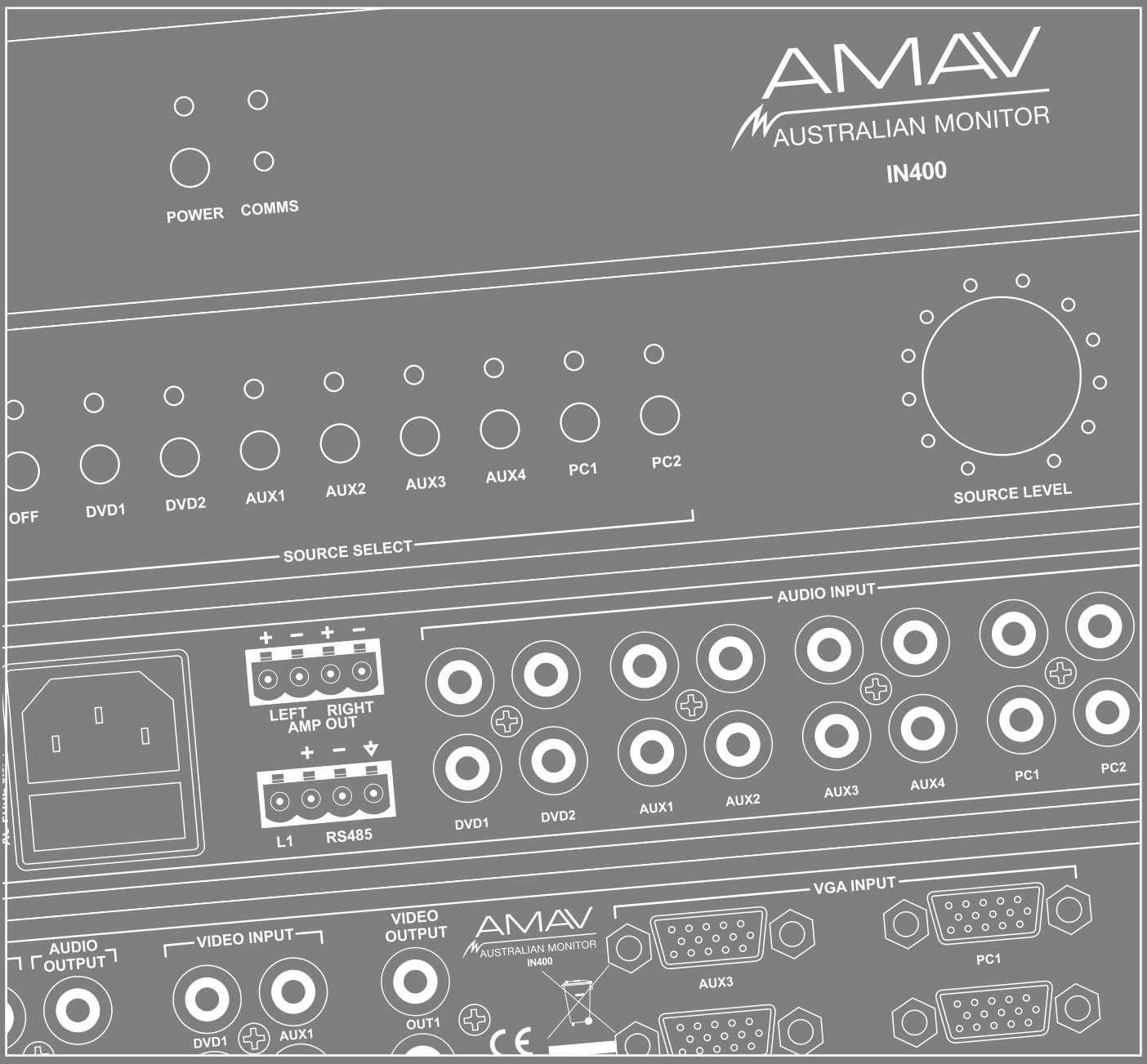
AMAV
AUSTRALIAN MONITOR

INNOVATION SERIES IN400

AV SWITCHING AMPLIFIER
INSTALLATION AND OPERATION MANUAL



IMPORTANT SAFETY INFORMATION

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.

13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
15. This appliance shall not be exposed to dripping or splashing water and that no object filled with liquid such as vases shall be placed on the apparatus.
16. Plug this apparatus to the proper wall outlet and make the plug to be disconnected readily operable.
17. Main plug is used as disconnected device and it should remain readily operable during intended use. In order to disconnect the apparatus from the mains completely, the mains plug should be disconnected from the mains socket outlet completely.
18. WARNING: To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.
19. An appliance with a protective earth terminal should be connected to a mains outlet with a protective earth connection.

PRÉCAUTIONS DURANT UTILISATION

1. LISEZ ces instructions.
2. Tenez ces instructions.
3. Notez tous les avertissements.
4. Suivez toutes les avertissements.
5. N'utilisez pas ce produit près de l'eau (la piscine, la plage, le lac, etc.).
6. Nettoyez seulement avec une étoffe sèche.
7. Ne bloquez aucuns troux de ventilation. Installez en accord avec les instructions du manufacturier.
8. N'installez près aucunes sources de chaleur comme radiateurs, registres de chaleur, fours ou les autres équipements (y compris amplificateurs) qui produisent la chaleur.
9. Ne défaites pas le but de sécurité de la fiche polarisée ou base-type. Une fiche polarisée a deux tranchants avec un plus large que l'autre. Une fiche de base type a deux a deux tranchants et une troisième pointe de base, le tranchant large ou la troisième pointe est fourni pour votre sécurité. Si la fiche donnée ne conforme pas votre prise de contact, consultez un électricien pour remplacement de la prise de contact obsolète.
10. Protegez le cordon de secteur contre être marchée dessus ou pincez en particulier aux fiches, aux douilles de convenance, et au point où ils sortent de l'appareil.
11. Seulement utilisez attachements/accessoires spécifiés par le manufacturier.
12. Utilisez seulement avec un chariot, un stand, un trépied, un support ou une table indiquée par le manufacturier, ou vendue avec l'appareil. Quand un chariot est utilisé, faites attention en déplaçant la combinaison d'appareil/chariot pour éviter de se déséquilibrer.

13. Arrachez la fiche du dispositif durant éclair et orage ou quand pas utilisé pour longues périodes de temps.
14. Référez au personnel qualifié de service pour toutes réparations. La réparation est donnée quand le système a été endommagé à n'importe façon, par exemple un fil ou une fiche endommagé(e) de la source d'alimentation. Avoir été exposé à pluie ou humidité, n'opère pas normalement, ou avoir été tombé.
15. L'appareil ne doit pas être exposé aux écoulements ou aux éclaboussures et aucun objet ne contenant de liquide, tel qu'un vase, ne doit être placé sur l'objet.
16. Branchez l'appareil à une source appropriée et faire que la prise à débrancher soit facilement accessible.
17. La prise du secteur ne doit pas être obstruée ou doit être facilement accessible pendant son utilisation. Pour être complètement déconnecté de l'alimentation d'entrée, la prise doit être débranchée du secteur.
18. AVERTISSEMENT: Pour éviter le risque d'incendie ou de chocs électriques, ne pas exposer cet appareil à la pluie ou à l'humidité.
19. Un appareil avec la borne de terre de protection doit être connecté au secteur avec la connexiion de terre de protection.

The Innovation series from AMAV is a huge step forward in the interfacing and management of audio and visual sources. Integrating a host of smart, high end features in a compact package that offers the end user extremely simple control over their complex audio visual system. The Innovation series is as ground breaking as it is simple to operate.

The IN400 is a compact AV switching amplifier with a host of extra features available to the AV integrator. With 8 AV inputs as well as mix in, stereo line output, 2 composite video outputs, VGA video output, 80 watt per channel powered outputs, IR control, RS485 control and video away from audio split the IN400 is perfect for boardroom, lecture theatre or training facility installations as a stand alone control unit or as part of a larger system interfacing with a third party control system.

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Copyright 21st Aug 2008
REV A 21st Aug 2008
REV B 9th Dec 2008
REV C 8th Apr 2010
REV D 7th June 2010

WARNING!

TO PREVENT FIRE OR SHOCK HAZARD, DO NOT USE THE PLUG WITH AN EXTENSION CORD, RECEPTACLE OR OTHER OUTLET UNLESS THE BLADES CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.

TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

TO PREVENT ELECTRICAL SHOCK, MATCH WIDE BLADE PLUG TO WIDE SLOT, FULLY INSERT.

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated “dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

CAUTION

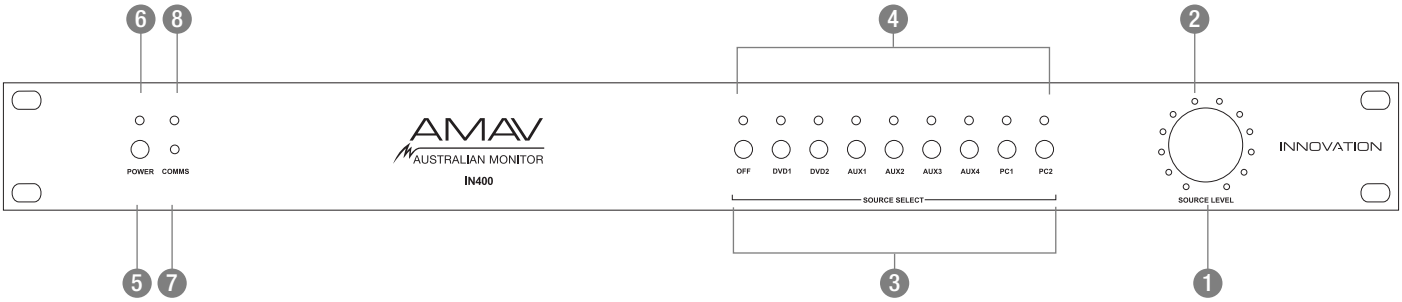
RISK OF ELECTRIC SHOCK
DO NOT OPEN

WARNING: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

Rating plate and caution marking are marked on the back enclosure of the apparatus

FRONT PANEL



1 MASTER VOLUME

This pot controls the audio output level.

2 MASTER VOLUME LEDS

These LED's indicate the position of the volume control. They do not indicate the strength of the signal.

3 SOURCE SELECT SWITCHES

These switches select the input that is routed to the audio and video outputs.

4 SOURCE SELECT LEDS

The LED above the switch indicates when the channel is being routed to the outputs.

LED State

1. A solid LED means that both audio and video from that source is routed to the respective outputs.
2. A long flasing LED means that audio from that source is routed to the audio output.
3. A short flasing LED means that video from that source is routed to the video output.

Source audio and video splitting is achievable through RS485. See the section on Communications on page 6 for more information.

5 POWER SWITCH

This switch switches the unit on.

6 POWER ON LED

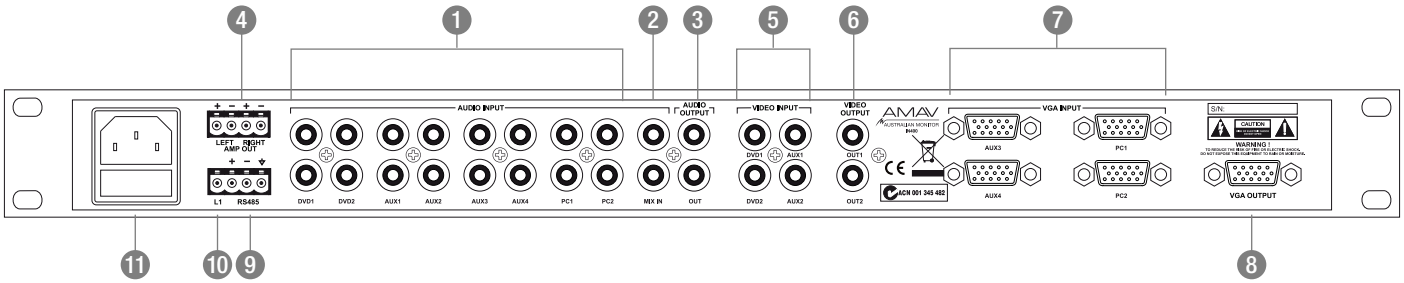
This indicates the unit is on.

7 IR SENSOR

This is the sensor used for IR control. A hand held remote control is supplied with the IN400. Line of sight is required for the remote control to work.

8 COMMS LED

This LED indicates when data is sent or revceived via IR or RS485.



1 AUDIO INPUT

Sources

These are the RCA unbalanced line level audio inputs for each of the 8 sources. The top RCA connector is the left channel, bottom RCA connector is the right channel.

2 MIX IN

This input is not switched but mixes with the selected audio source. The bass/treble/volume controls do not affect this input. This feature can be used in paging environments or emergency systems in conjuction with the L1 trigger input.

3 AUDIO OUTPUT

These are the left (top) and right (bottom) RCA unbalanced line level outputs.

4 AMP OUT

The IN400 has a built in audio stereo power amplifier. The input signal is parallelled from the AUDIO OUTPUT. The power amp is rated at 2 x 80W into 4 ohm, 2 x 50W into 8ohm. The minimum load is 4ohm. The outputs are on a 5.08mm pluggable connector.

5 VIDEO INPUT

These are RCA unbalanced 75ohm composite video inputs for the DVD1/DVD2/AUX1/AUX2 sources.

6 VIDEO OUTPUT

These are the RCA unbalanced 75ohm composite video outputs. OUT1 and OUT2 output the same signal but they are individually buffered. These outputs only output the signal from DVD1/DVD2/AUX1/AUX2 sources if selected.

7 VGA INPUT

These are high densisty 15pin D connector VGA inputs for the PC1/PC2/AUX3/AUX4 sources.

8 VGA OUTPUT

This is the high densisty 15pin D connector VGA output. This output only outputs the signal from PC1/PC2/AUX3/AUX4 sources if selected.

9 RS485

This 5.08mm pluggable connector socket is provided for external control of the IN400 using RS485.

10 L1

This input is used to mute the audio outputs. The MIX IN is not affected. This feature can be used in paging environments or emergency systems. Short it to the RS485 ground pin to activate it.

11 IEC MAINS INPUT SOCKET

This is a standard IEC 3 pin socket (IEC320-C14). It accepts a standard IEC mains cable, provided. The fuse draw contains the mains fuse and a spare. The mains fuse is a time lag (slow blow) HRC 20mm x 5mm fuse. The ratings are:

230V Model T3.15A

120V Model T6.3A

Always replace the fuse with one of the same value and type.

Note: Always disconnect power to the amplifier before replacing fuses.

RS485 Settings

Baud Rate: 9600
No. of Bits: 8
Stop Bit: 1
Parity Bit: None

Word Structure

! - Start byte
XXX - 3 byte command
: - delimiter
XXX - 3 byte data
<CR> - carriage return
All bytes are ASCII characters.

RS485 Setup

The IN400 data port is an RS485 serial data port. Twisted pair cabling should be used when connecting RS485 devices, such as CAT3, CAT5, CAT5e or CAT6 UTP cabling. RS485 data networks should be wired in a 'daisy chain' configuration with a maximum of 32 devices in the chain. The IN400 is not terminated so may be inserted anywhere in the data network. If the IN400 is being used at the end of a chain, a 120ohm (characteristic impedance of UTP) terminating resistor should be connected between the + and - connections.

The IN400 has built in failsafe bias circuitry so there are no need for external biasing resistors. The maximum length of the chain is 500m.

Data Commands

COMMS	DESCRIPTION
!VER:???<CR>	Version request. Device replies with !VER=xyz where xyz is the version ID of the firmware.
!GMD:???<CR>	Global Mode request. Device replies with !GMD=00x, where x is 0 if global mode is not active and 1 if global mode is active.
!LOK:???<CR>	Panel Lock request. Device replies with !LOK=00x, where x is 0 if panel lock is not active and 1 if panel lock is active.
!PWR:???<CR>	Soft Power request. Device replies with !PWR=00x, where x is 0 if soft power state if off and 1 if soft power state is on.
!BAS:???<CR>	Bass request. Device replies with !BAS=0xy, where xy is the current setting of bass.
!TRE:???<CR>	Treble request. Device replies with !TRE=0xy, where xy is the current setting of treble.
!VOL:???<CR>	Volume request. Device replies with !VOL=xyz, where xyz is the current setting of volume.
!MUT:???<CR>	Mute request. Device replies with !MUT=0xy, where x represents the audio mute and y represents the video mute.
!SRS:???<CR>	Source request. Device replies with !SRS=0xy, where x represents the audio source and y represents the video source.
!GMD:000<CR>	Global Mode set. Global mode is deactivated. Device replies with !GMD=000 when done.
!GMD:001<CR>	Global Mode set. Global mode is activated. Device replies with !GMD=001 when done.
!LOK:000<CR>	Panel Lock set. Panel lock is deactivated. Device replies with !LOK=000 when done.
!LOK:001<CR>	Panel Lock set. Panel lock is activated. Device replies with !LOK=001 when done.
!PWR:000<CR>	Soft Power set. Device is put into soft power off. Device replies with !PWR=000 when done.
!PWR:001<CR>	Soft Power set. Device is put into soft power on. Device replies with !PWR=001 when done.
!MUT:0xy<CR>	Mute set. If x is 0, the audio is muted. If y is 0, the video is muted. If x is 1, the audio is unmuted. If y is 1, the video is unmuted. Device replies with !MUT=0ab, where a represents the new audio mute state and b represents the new video mute state.
!SRS:0xy<CR>	Source Select set. The audio source is set to x. The video source is set to y. Device replies with !SRS=0ab, where a represents the new audio source and b represents the new video source.
!VOL:xyz<CR>	Volume set. The volume is set to xyz. The device replies with !VOL=abc where abc is the new volume.
!VOL:+++<CR>	Volume increment. The volume is incremented by 1. The device replies with !VOL=abc where abc is the new volume.
!VOL:---<CR>	Volume decrement. The volume is decremented by 1. The device replies with !VOL=abc where abc is the new volume.
!BAS:0xy<CR>	Bass set. The bass is set to xy. The device replies with !BAS=0ab where ab is the new bass.
!BAS:+++<CR>	Bass increment. The bass is incremented by 1. The device replies with !BAS=0ab where ab is the new bass.
!BAS:---<CR>	Bass decrement. The bass is decremented by 1. The device replies with !BAS=0ab where ab is the new bass.
!TRE:0xy<CR>	Treble set. The treble is set to xy. The device replies with !TRE=0ab where ab is the new treble.
!TRE:+++<CR>	Treble increment. The treble is incremented by 1. The device replies with !TRE=0ab where ab is the new treble.
!TRE:---<CR>	Treble decrement. The treble is decremented by 1. The device replies with !TRE=0ab where ab is the new treble.

Global Mode

When the IN400 is in global mode, changes to the volume and tone affect all the sources.
When not in global mode, changes to the volume and tone affects the selected source.

All installation work should be done with the power disconnected. The following inforamtion will help with installation. After installation is complete power up all the sources before turning on the IN400.

POWER CONNECTION

Ensure the mains voltage supply matches the rear of the IN400 (+/- 10%)

Ensure that all system grounds (earth) are connected to a common point. Avoid powering equipment within a system from multiple power sources that may be separated by large distances. This will eliminate ground loops that are heard as 50/60Hz humming or buzzing in speakers and seen as moving or stationary bars on video equipment.

INPUT CONNECTIONS

Audio
All the inputs are unbalanced RCA sockets. Unbalanced RCA wiring should be keep as short as possible. Typically less than 3m.

Video
Video inputs are on either unbalanced RCA sockets (composite) or 15 pin high density female connectors D-connectors (VGA). The maximum cable length for composite video is typically less than 3m for shielded wire and 10m for coaxial before signal degradation. This will depend on the cable quality.

OUTPUT CONNECTIONS

Audio
The line level outputs are unbalanced RCA sockets. Unbalanced RCA wiring should be keep as short as possible. Typically less than 3m.

The amplifier outputs are 5.08mm pluggable connectors. Use the following table for selecting a suitable guage wire for the cable you are running over a particular distance. The table is for a 1dB drop in level which is generally considered acceptable.

	AWG10	AWG13	AWG14	AWG16	AWG17	AWG18	AWG20	AWG22	AWG24	AWG26
Speaker										
16	279	125	100	75	51	38	26	17	11	6
8	139	62	50	37	26	19a	13	9	6	3
4	70	31	25	19	13	10				

Do not connect a total impedance of less than 4ohm per channel.

OUTPUT CONNECTIONS (cont.)

Video
Video outputs are on either unbalanced RCA sockets (composite) or 15 pin high density female connectors D-connectors (VGA). The maximum cable length for composite video is typically less than 3m for shielded wire and 10m for coaxial before signal degradation. This will depend on the cable quality.

There are two composite outputs for running to 2 different monitors without the need for an external distribution amplifier.

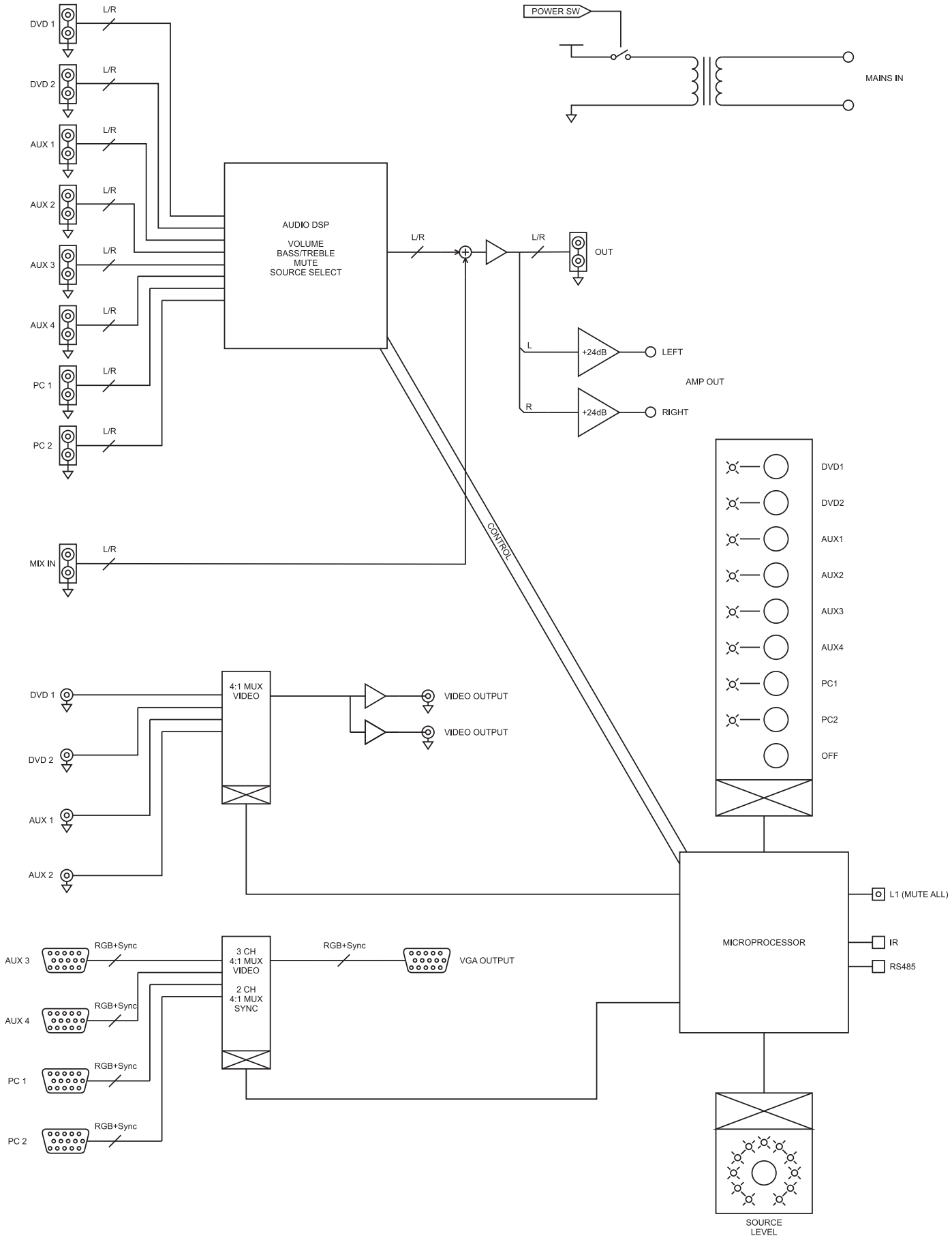
VGA pin out
1 Red out
2 Green out
3 Blue out
4 Monitor ID 2 in
5 Ground
6 Red return
7 Green return
8 Blue return
9 no pin
10 Sync return
11 Monitor ID 0 in
12 Monitor ID 1 in
13 Horizonal Sync out
14 Vertical Sync out
15 reserved (monitor ID 3)
Only pins 1,2,3,5,6,7,8,10,13,14 are used in the IN400.

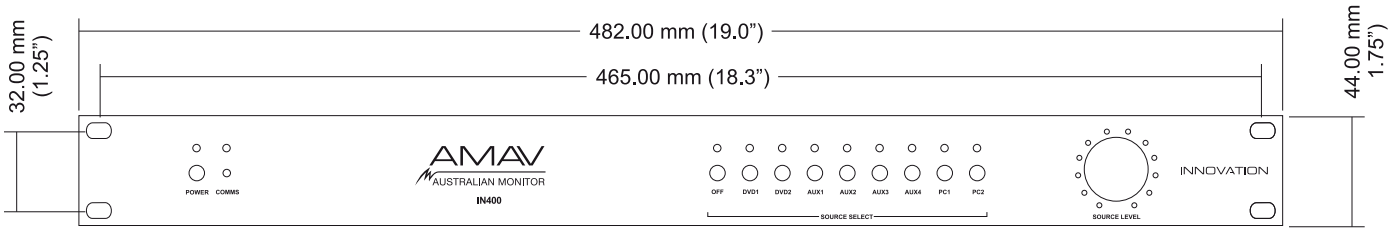
RS485 CONNECTIONS

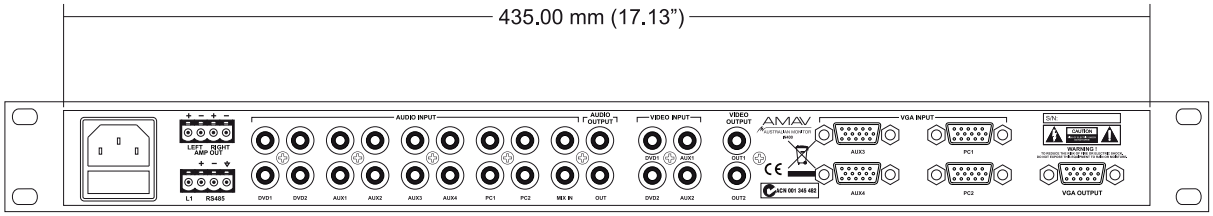
The RS485 data port is on a 5.08mm pluggable connectors. Twisted pair cabling should be used When connecting RS485 devices, such as CAT3, CAT5, CAT5e or CAT6 UTP cabling. RS485 data networks should be wired in a ‘daisy chain’ configuration with a maximum of 32 devices in the chain. The IN400 is not terminated so may be inserted anywhere in the data network. If the IN400 is being used at the end of a chain, a 120ohm (characteristic impedance of UTP) terminating resistor should be connected between the + and - connections.

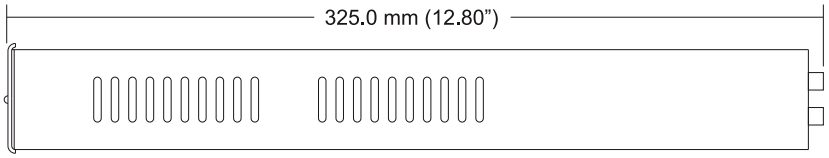
The maximum length of the chain is 500m.

BLOCK DIAGRAM




32.00 mm
(1.25")
482.00 mm (19.0")
465.00 mm (18.3")
44.00 mm
1.75")
POWER
COMMS
AMAV
AUSTRALIAN MONITOR
IN400
OFF
DVD1
DVD2
AUX1
AUX2
AUX3
AUX4
PC1
PC2
SOURCE SELECT
SOURCE LEVEL
INNOVATION


435.00 mm (17.13")
AUDIO INPUT
AUDIO OUTPUT
VIDEO INPUT
VIDEO OUTPUT
VGA INPUT
LEFT
RIGHT
AMP OUT
L1
RS485
DVD1
DVD2
AUX1
AUX2
AUX3
AUX4
PC1
PC2
MIX IN
OUT
OUT1
OUT2
VGA OUTPUT


325.0 mm (12.80")

SPECIFICATIONS

POWER OUTPUT (0.5%THD, 1kHz)		8ohm 50W, 4ohm 80W
THD (20-10kHz, 8ohm, -2dBr)		Better than 0.1%
Frequency Response(+/-3dB)		20-20kHz
Gain		24dB @ 8ohm
Line Audio	THD	<0.5%
	Noise Floor	-90dBu
	Frequency Response(+/-3dB)	20Hz-20kHz
	Headroom	+5dBu
Video	VGA	High speed RGB+Sync switching
	Video	Composite 75ohm Buffered outputs
	Video follows Audio switching	
Comms	Type	RS485
	Baud Rate	9600
	No of Data Bit	8
	Parity	None
	No of Stop Bits	1
Power Consumption		1/8th power 150VA (0.65A)
Thermal output		1/8th power 100W (341.2Btu/hr)
SIZE (WXHXD)		482 x 44 x 325mm 19 " x 1.75" x 12.8"
NET WEIGHT		7.0kg 15.4lb
SHIPPING WEIGHT		9.0kg 19.8lb
SHIPPING DIMENSIONS (WXHXD)		520 x 90 x 420 mm 19.0" x 3.5" x 16.5"

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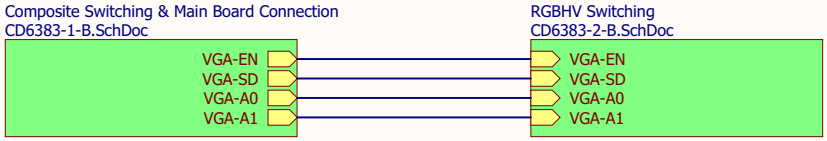
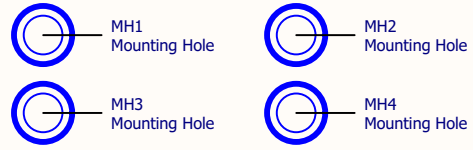
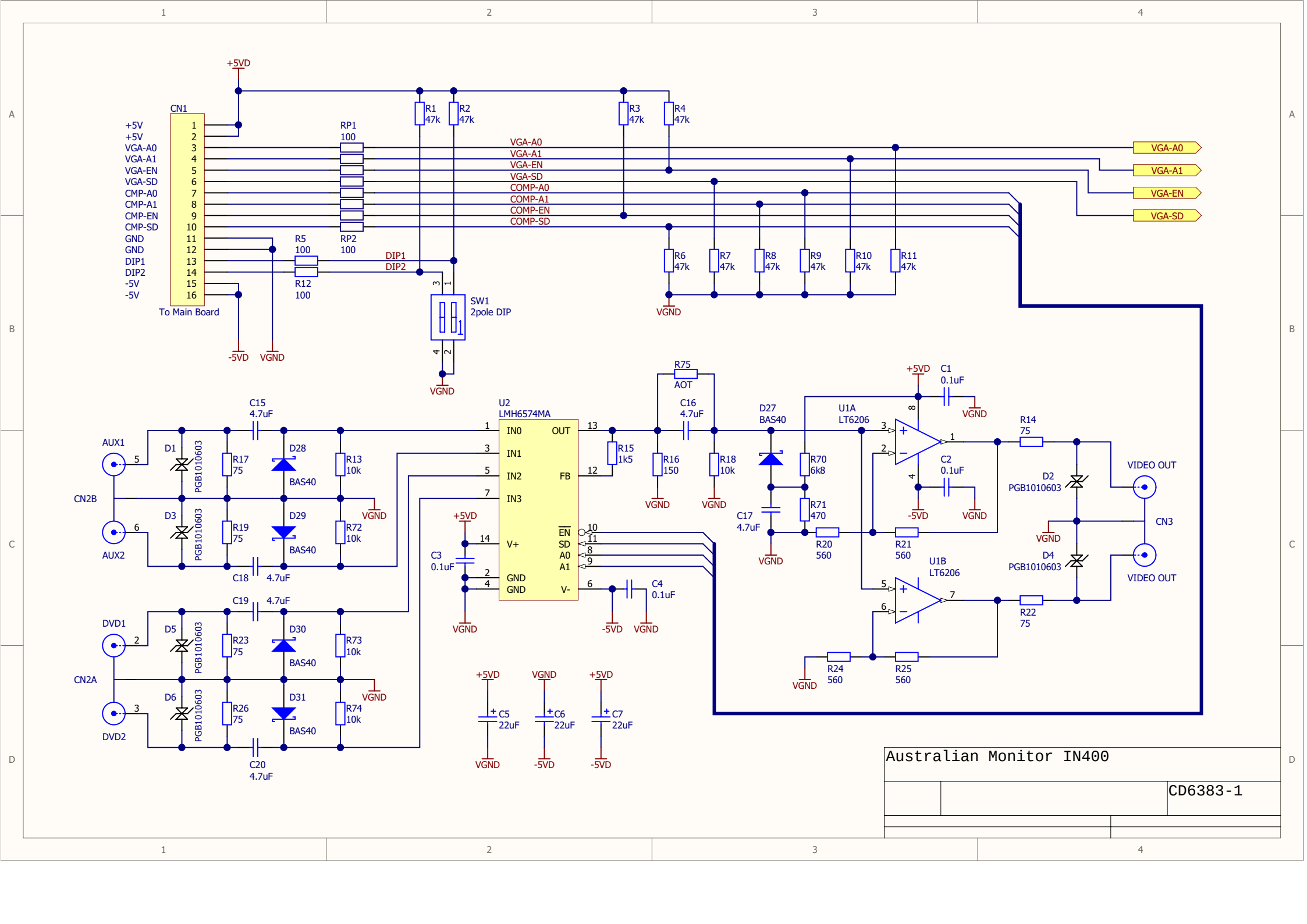
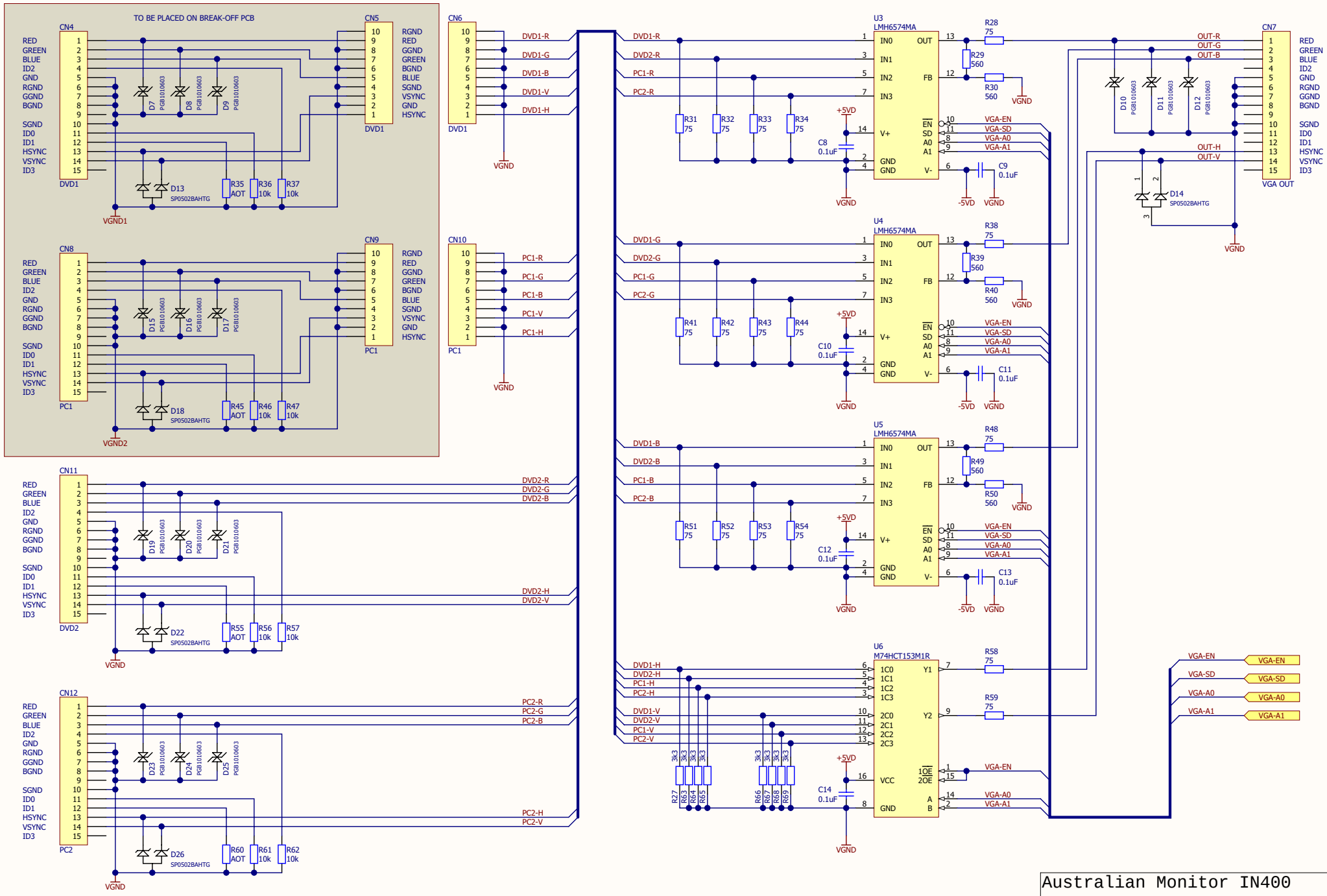




Australian Monitor IN400


+5VD
CN1
+5V 1
+5V 2
VGA-A0 3
VGA-A1 4
VGA-EN 5
VGA-SD 6
CMP-A0 7
CMP-A1 8
CMP-EN 9
CMP-SD 10
GND 11
GND 12
DIP1 13
DIP2 14
-5V 15
-5V 16
To Main Board
RP1
100
RP2
100
R1 47k
R2 47k
R3 47k
R4 47k
R5 100
R12 100
DIP1
DIP2
SW1
2pole DIP
R6 47k
R7 47k
R8 47k
R9 47k
R10 47k
R11 47k
VGA-A0
VGA-A1
VGA-EN
VGA-SD
COMP-A0
COMP-A1
COMP-EN
COMP-SD
VGND
-5VD
R75
AOT
C15 4.7uF
C16 4.7uF
U2
LMH6574MA
IN0
IN1
IN2
IN3
V+
GND
GND
OUT
FB
EN
SD
A0
A1
V-
R15 1k5
R16 150
R18 10k
C3 0.1uF
C4 0.1uF
D27 BAS40
C17 4.7uF
R70 6k8
R71 470
R20 560
U1A LT6206
C1 0.1uF
C2 0.1uF
R21 560
U1B LT6206
R22 75
R24 560
R25 560
R14 75
VIDEO OUT
CN3
D2 PGB1010603
D4 PGB1010603
AUX1
AUX2
CN2B
D1 PGB1010603
D3 PGB1010603
R17 75
R19 75
D28 BAS40
D29 BAS40
R13 10k
R72 10k
C18 4.7uF
DVD1
DVD2
CN2A
D5 PGB1010603
D6 PGB1010603
R23 75
R26 75
D30 BAS40
D31 BAS40
R73 10k
R74 10k
C19 4.7uF
C20 4.7uF
C5 22uF
C6 22uF
C7 22uF
Australian Monitor IN400
CD6383-1


TO BE PLACED ON BREAK-OFF PCB
CN4
CN5
CN6
CN7
CN8
CN9
CN10
CN11
CN12
RED
GREEN
BLUE
ID2
GND
RGND
GGND
BGND
SGND
ID0
ID1
HSYNC
VSYNC
ID3
DVD1
PC1
DVD2
PC2
VGA OUT
D7
D8
D9
D10
D11
D12
D13
D14
D15
D16
D17
D18
D19
D20
D21
D22
D23
D24
D25
D26
PGB1010603
SP0502BAHTG
R35
R36
R37
R38
R39
R40
R41
R42
R43
R44
R45
R46
R47
R48
R49
R50
R51
R52
R53
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R55
R56
R57
R58
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R60
R61
R62
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R31
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R34
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VGND2
VGND
-5VD
+5VD
U3
U4
U5
U6
LMH6574MA
M74HCT153M1R
C8
C9
C10
C11
C12
C13
C14
0.1uF
DVD1-R
DVD1-G
DVD1-B
DVD1-V
DVD1-H
PC1-R
PC1-G
PC1-B
PC1-V
PC1-H
DVD2-R
DVD2-G
DVD2-B
DVD2-H
DVD2-V
PC2-R
PC2-G
PC2-B
PC2-H
PC2-V
VGA-EN
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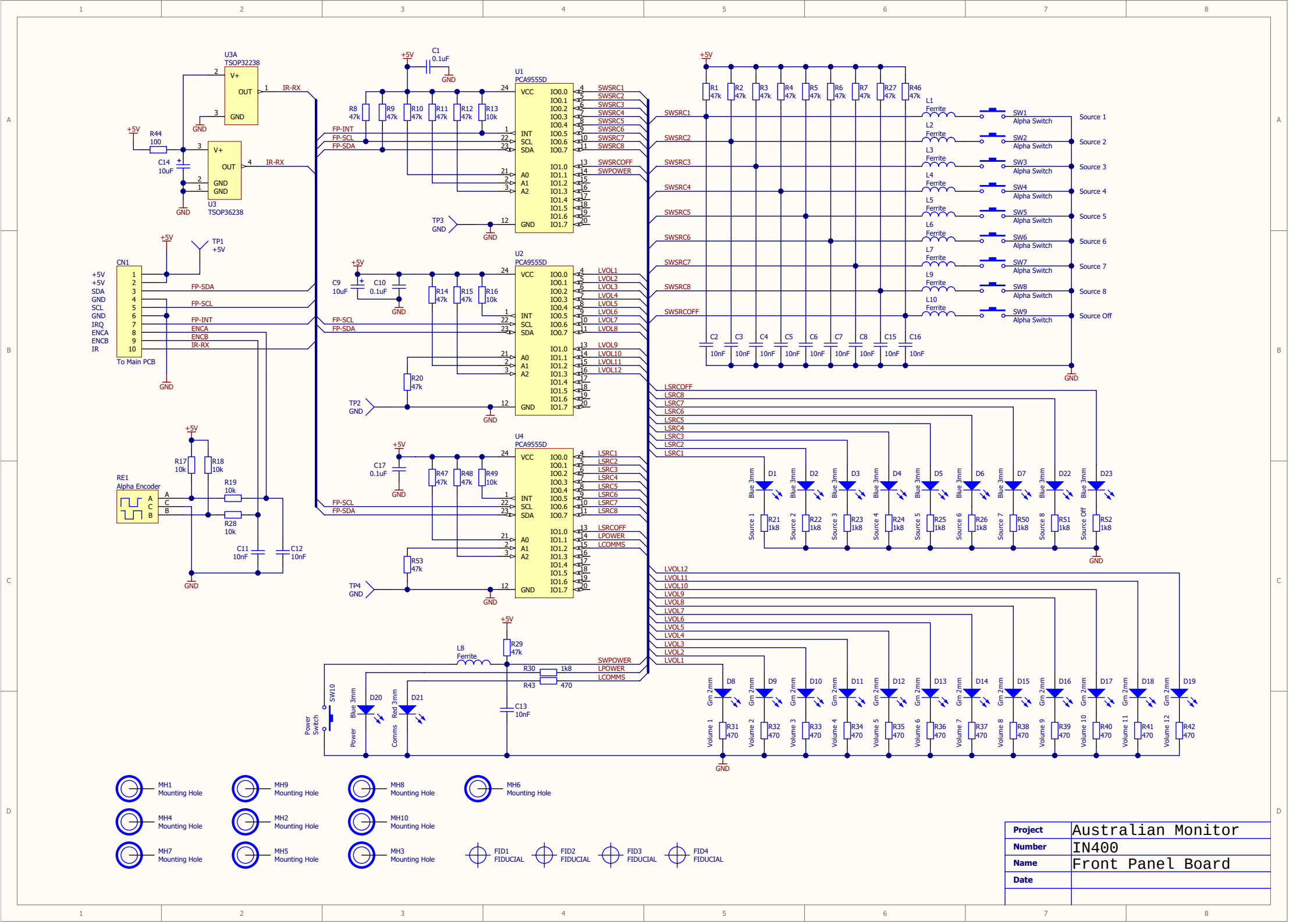
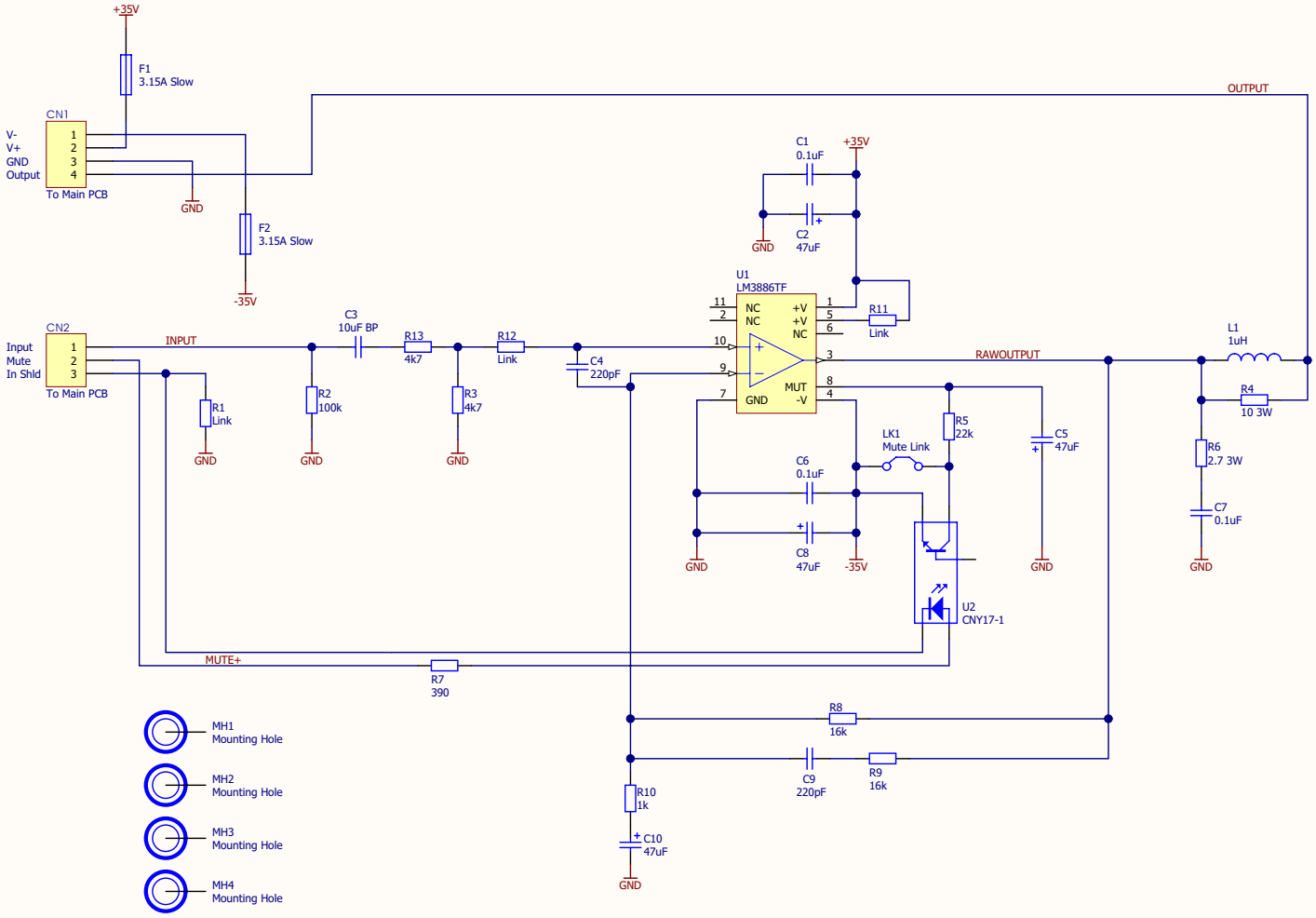
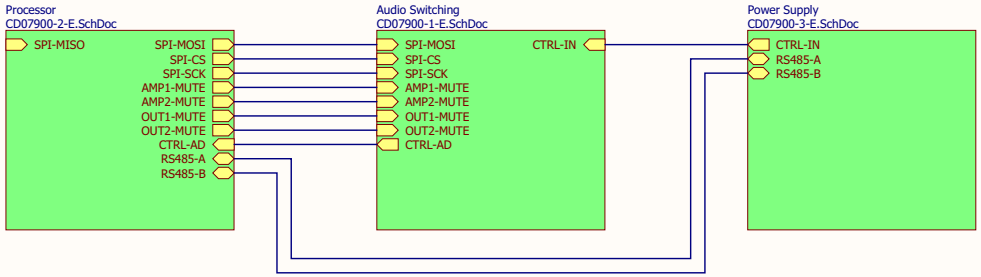
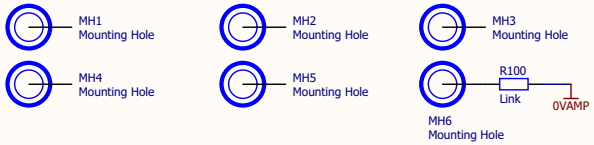
VGA-A1
OUT-R
OUT-G
OUT-B
OUT-H
OUT-V
Australian Monitor IN400
CD6383-2


U3A
TSOP32238
IR-RX
U3
TSOP36238
U1
PCA9555D
U2
PCA9555D
U4
PCA9555D
FP-INT
FP-SCL
FP-SDA
SWSRC1
SWSRC2
SWSRC3
SWSRC4
SWSRC5
SWSRC6
SWSRC7
SWSRC8
SWSRCOFF
SWPOWER
LVOL1
LVOL2
LVOL3
LVOL4
LVOL5
LVOL6
LVOL7
LVOL8
LVOL9
LVOL10
LVOL11
LVOL12
LSRC1
LSRC2
LSRC3
LSRC4
LSRC5
LSRC6
LSRC7
LSRC8
LSRCOFF
LPOWER
LCOMMS
CN1
To Main PCB
RE1
Alpha Encoder
SW1
Alpha Switch
Source 1
Source 2
Source 3
Source 4
Source 5
Source 6
Source 7
Source 8
Source Off
Power Switch
MH1 Mounting Hole
MH2 Mounting Hole
MH3 Mounting Hole
MH4 Mounting Hole
MH5 Mounting Hole
MH6 Mounting Hole
MH7 Mounting Hole
MH8 Mounting Hole
MH9 Mounting Hole
MH10 Mounting Hole
FID1 FIDUCIAL
FID2 FIDUCIAL
FID3 FIDUCIAL
FID4 FIDUCIAL
Project Australian Monitor
Number IN400
Name Front Panel Board
Date

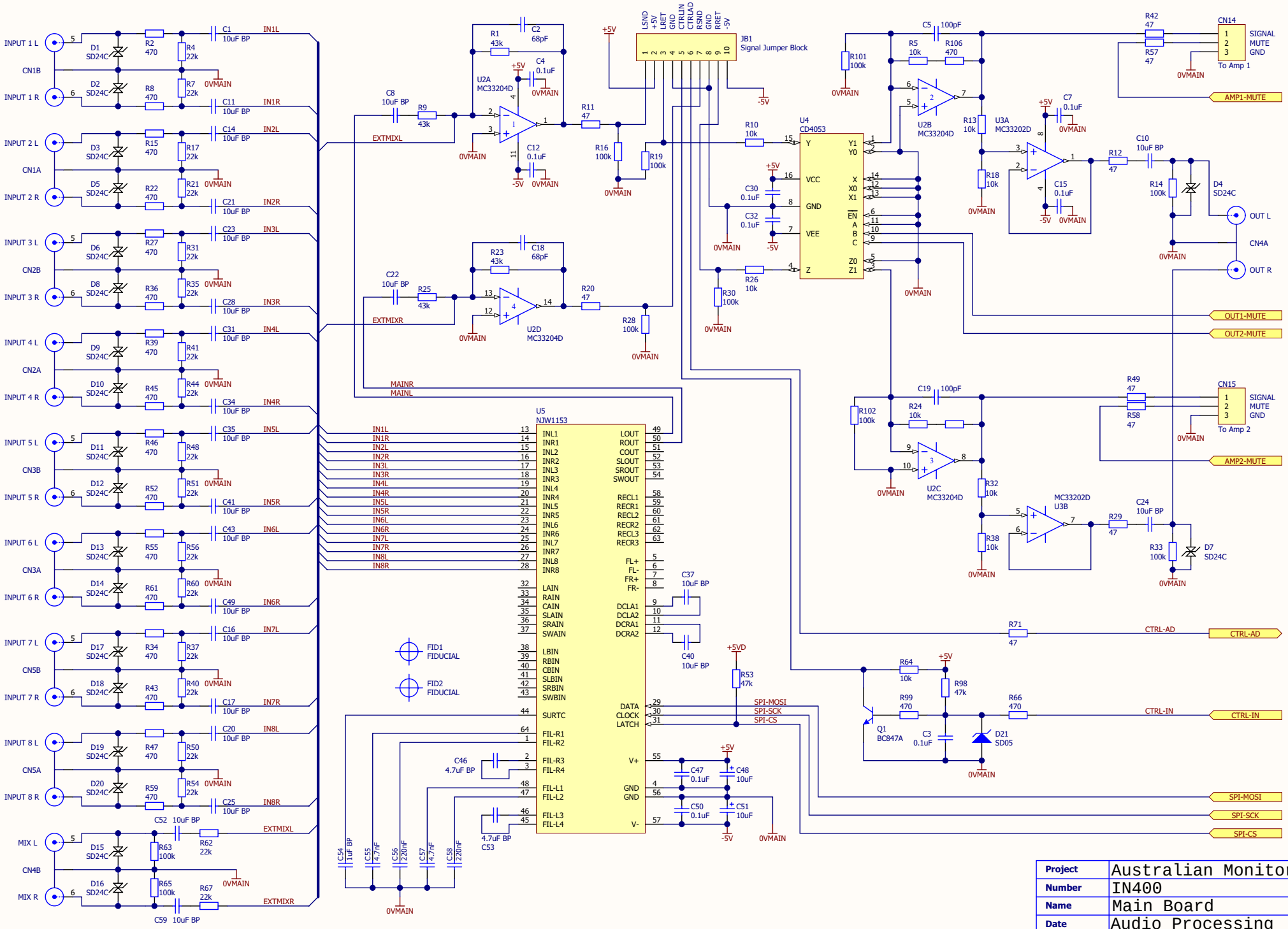


Project	Australian Monitor
Number	IN400
Name	Power Amplifier Board
Date	

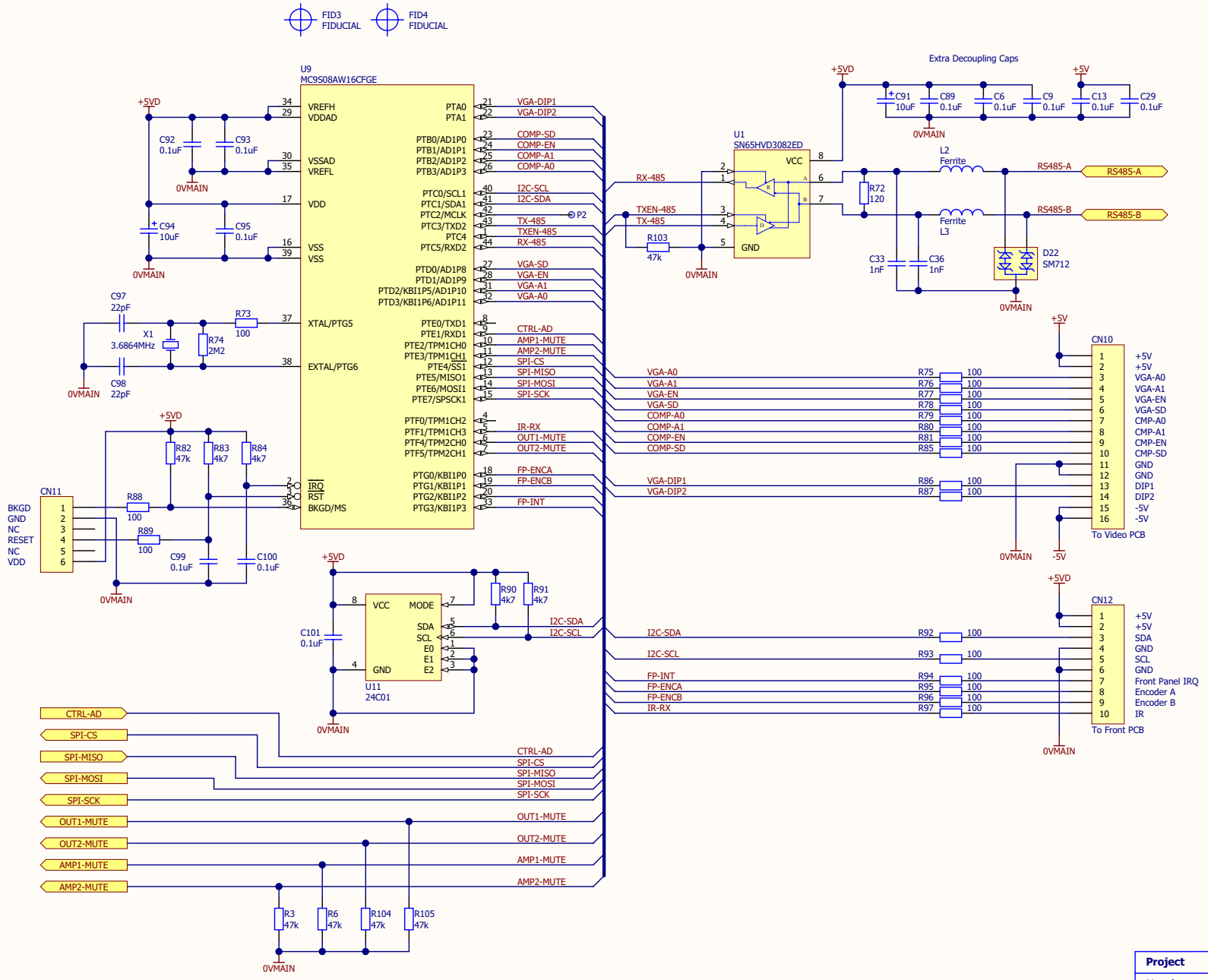




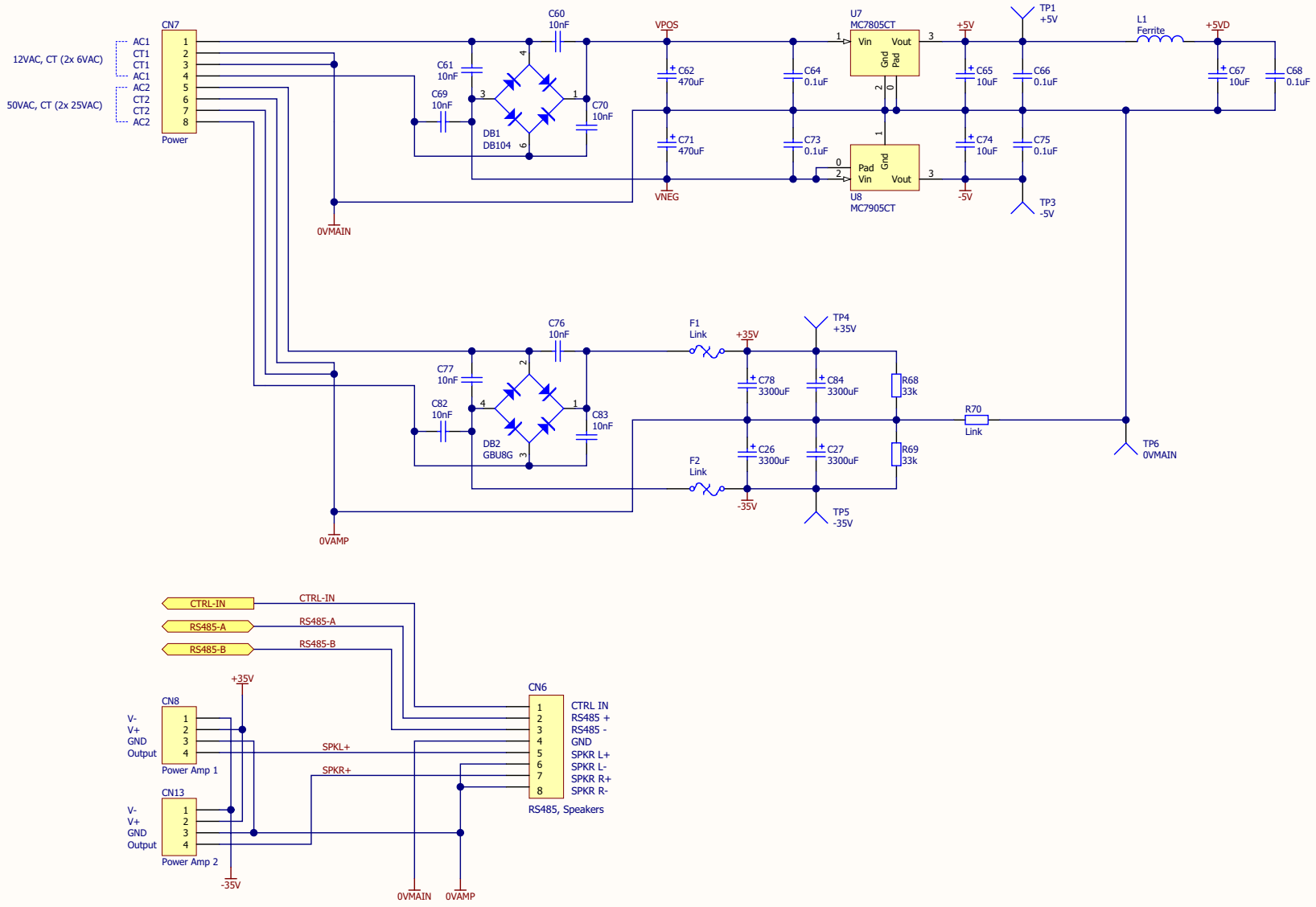
Project	Australian Monitor
Number	IN400
Name	
Date	



Project	Australian Monitor
Number	IN400
Name	Main Board
Date	Audio Processing



Project	Australian Monitor
Number	IN400
Name	Main Board
Date	Processor & Digital



Project	Australian Monitor
Number	IN400
Name	Main Board
Date	Power Supply

TEST PROCEDURE IN400

Revision	Date	Comments
A	22nd May 2008	Original
B	6th May 2008	Changed some signal gen sensitvities.

Outline

1. Physical checks
2. Set up device for test
    - 2.1. Fuse check
    - 2.2. Connections
3. Power up
    - 3.1. Voltages
4. Programming
5. Functional Checks
    - 5.1. General Operation
    - 5.2. IR Operation
    - 5.3. RS485 Operation
6. Basic Amplifier Checks
    - 6.1. Left Channel
    - 6.2. Right Channel
7. THD, Left Channel Power Amp
8. THD, Right Channel Power Amp
9. Bandwidth, Left Channel Power Amp
10. Bandwidth, Right Channel Power Amp
11. Noise Floor, Left Channel Power Amp
12. Noise Floor, Right Channel Power Amp
13. A/V Switching Tests
    - 13.1. Sources DVD1, DVD2, AUX1, AUX2
    - 13.2. Sources AUX3, AUX4, PC1, PC2
14. Mix Inputs
15. Non-Volatile Memory Setting
16. Final check for damage
17. Factory setting
18. Listening Test
    - 18.1. Switch on thump
    - 18.2. Audio quality
    - 18.3. Control Input Fading
    - 18.4. Bass/Treble

Test Procedure

VISUAL INSPECTION STAGE

1. Physical checks

- All screws for tightness, referring to the torque setting of the manufacturing tools
- Capacitors for polarity where applicable
- All wiring points for good contacts (soldering and crimping)

PRETESTING

PRE TESTING SETUP REQUIREMENT

a) Oscilloscope
b) Variac
c) Multimeter
d) Load [8ohm]

2. Set up device for test :

2.1. Fuse check

2 x DC fuses (3.15A), 20x5mm
1 x AC fuses (2A), 20x5mm

2.2. Connections

Connect unit to:

Variac (240Vac), power initially off
Signal generator (DVD1 left input, no signal)
Resistive load (8ohm on left amplifier output) with meters/oscilloscope

3. Power up :

Adjust voltage to 240VAC. Turn on variac power. Watch current meter for excess current draw.

(P/F) Current shall not exceed <?>A (AC current)

3.1. Voltages

(P/F) Measure the following DC voltages with a multimeter referenced to ground testpoint TP6 on the 07900 PCB.

	Location	Pass Range
Low Rail Filtered Pos	U7 pin 1	7VDC to 10VDC
Low Rail Filtered Neg	U8 pin 2	-7VDC to -10VDC
Regulated +5V	TP1	4.7VDC to 5.3VDC
Regulated -5V	TP3	-4.7VDC to –5.3VDC
High Rail Filtered Pos	TP4	35VDC to 39VDC
High Rail Filtered Neg	TP5	-35VDC to -39VDC

4. Programming :

Connect the programming pod to connector CN11 and follow the programming procedure document.

(P/F) The programming must complete successfully.

5. Functional Checks :

5.1. General Operation

Ensure that power is applied to the unit. On first power-up, all front panel indicators should be OFF.

(P/F) Press the power button. The power LED should light. Source Off should be by default active and the LED above it lit.

(P/F) Press the source DVD1 button. The LED above it should light.
(P/F) Press the source DVD2 button. The LED above it should light.
(P/F) Press the source AUX1 button. The LED above it should light.
(P/F) Press the source AUX2 button. The LED above it should light.
(P/F) Press the source AUX3 button. The LED above it should light.
(P/F) Press the source AUX4 button. The LED above it should light.
(P/F) Press the source PC1 button. The LED above it should light.
(P/F) Press the source PC2 button. The LED above it should light.

(P/F) Rotate the rotary encoder in either direction to ensure that all LEDs can be lit, one at a time. Ensure that there are no strange "jumps" in the lighting pattern. Note that source PC2 should still be selected for this test.

(P/F) Move the rotary encoder such that the highest volume LED is lit (fully CW). On the rear panel, connect logic input L1 to the ground pin in the same 4-way connector. The lit volume LED should commence flashing. Disconnect L1 from ground. The volume LED should stop flashing.

(P/F) Move the rotary encoder and observe the Comms LED. It should briefly flash with each movement of the encoder.

5.2. IR Operation

Ensure that the power LED of the unit is lit. If not, press the power button.

(P/F) Press each button on the IR remote control supplied with the unit and verify that for each button, the Comms LED on the main unit flashes briefly. Depending on the button pushed, the unit will light other LEDs and change volume etc but this can be ignored at present.

5.3. RS485 Operation

Ensure that the power LED of the unit is lit. If not, press the power button.

This section to be completed once external control panel specifications have been defined.

6. Basic Amplifier Check :

6.1. Left Channel

Setup

Signal generator = 350mVAC, Sine, 1kHz
Signal input = DVD1, left channel RCA input
Power state of unit: ON
Selected source on unit: DVD1
Volume on unit: MIN (lowest volume LED lit).
Bass/Treble on unit = flat (use Eq Flat button on IR remote to reset this)
Load: Connected to left channel amplifier output

Procedure

Set volume on unit to max by rotating the volume control CW until the highest LED is lit.

(P/F) Measure the voltage on the load. It should be 20VAC (+/- 2VAC), with no gross signal clipping evident.

6.2. Right Channel

Setup

Signal generator = 350mVAC, Sine, 1kHz
Signal input = DVD1, right channel RCA input
Power state of unit: ON
Selected source on unit: DVD1
Volume on unit: MIN (lowest volume LED lit).
Bass/Treble on unit = flat (use Eq Flat button on IR remote to reset this)
Load: Connected to right channel amplifier output

Procedure

Set volume on unit to max by rotating the volume control CW until the highest LED is lit.

(P/F) Measure the voltage on the load. It should be 20VAC (+/- 2VAC), with no gross signal clipping evident.

FINAL TESTING

REQUIREMENTS FOR FINAL TESTING:

a) THD meter
b) Signal generator
c) Load 8ohm
d) Multimeter
e) Oscilloscope
f) Variac 240VAC, voltage selector switch on DUT set to 240V
g) Composite video source
h) Composite video display
i) RGBHV video source (capable of 1280 x 1024 resolution)
j) RGBHV video display (capable of 1280 x 1024 resolution)

7. THD, Left Channel Power Amp

Setup

Signal generator = 300mVAC, Sine, 1kHz
Signal input = DVD1, left channel RCA input
Power state of unit: ON
Selected source on unit: DVD1
Volume on unit: MIN (lowest volume LED lit).
Bass/Treble on unit = flat (use Eq Flat button on IR remote to reset this)
Load: Connected to left channel amplifier output

Procedure

Set volume on unit to max by rotating the volume control CW until the highest LED is lit.

(P/F) Reading shall be < 0.2%.

Values to be recorded:

		Value	Pass Range
7.	THD, Left Amp		0% – 0.2%

8. THD, Right Channel Power Amp

Setup

Signal generator = 300mVAC, Sine, 1kHz
Signal input = DVD1, right channel RCA input
Power state of unit: ON
Selected source on unit: DVD1
Volume on unit: MIN (lowest volume LED lit).
Bass/Treble on unit = flat (use Eq Flat button on IR remote to reset this)
Load: Connected to right channel amplifier output

Procedure

Set volume on unit to max by rotating the volume control CW until the highest LED is lit.

(P/F) Reading shall be < 0.2%.

Values to be recorded:

		Value	Pass Range
8.	THD, Right Amp		0% – 0.2%

9. Bandwidth, Left Channel Power Amp

Setup

Signal generator = 300mVAC, Sine, 1kHz
Signal input = DVD1, left channel RCA input
Power state of unit: ON
Selected source on unit: DVD1
Volume on unit: MIN (lowest volume LED lit).
Bass/Treble on unit = flat (use Eq Flat button on IR remote to reset this)
Load: Connected to left channel amplifier output

Procedure

Set volume on unit to max by rotating the volume control CW until the highest LED is lit. Adjust the frequency on the signal generator until the output is 16VAC.

(P/F) The frequency shall be between 10Hz and 30Hz.

Adjust the frequency on the signal generator up till the output is 16VAC.

(P/F) The frequency shall be >18kHz.

Values to be recorded

		Value	Pass Range
9a.	BW Left Amp - low		10Hz – 30Hz
9b.	BW Left Amp - high		>18kHz

10. Bandwidth, Right Channel Power Amp

Setup

Signal generator = 300mVAC, Sine, 1kHz
Signal input = DVD1, right channel RCA input
Power state of unit: ON
Selected source on unit: DVD1
Volume on unit: MIN (lowest volume LED lit).
Bass/Treble on unit = flat (use Eq Flat button on IR remote to reset this)
Load: Connected to right channel amplifier output

Procedure

Set volume on unit to max by rotating the volume control CW until the highest LED is lit. Adjust the frequency on the signal generator until the output is 16VAC.

(P/F) The frequency shall be between 10Hz and 30Hz.

Adjust the frequency on the signal generator up till the output is 16VAC.

(P/F) The frequency shall be >18kHz.

Values to be recorded

		Value	Pass Range
10a.	BW Right Amp - low		10Hz – 30Hz
10b.	BW Right Amp - high		>18kHz

11. Noise Floor, Left Channel Power Amp

Setup

Signal generator = OFF
Signal input = DVD1, left channel RCA input
Power state of unit: ON
Selected source on unit: DVD1
Volume on unit: MIN (lowest volume LED lit).
Bass/Treble on unit = flat (use Eq Flat button on IR remote to reset this)
Load: Connected to left channel amplifier output

Procedure

Set volume on unit to max by rotating the volume control CW until the highest LED is lit.

(P/F) The residual noise floor should be <1mV.

Values to be recorded

		Value	Pass Range
11a.	Noise Left Amp		<1mV

12. Noise Floor, Right Channel Power Amp

Setup

Signal generator = OFF
Signal input = DVD1, right channel RCA input
Power state of unit: ON
Selected source on unit: DVD1
Volume on unit: MIN (lowest volume LED lit).
Bass/Treble on unit = flat (use Eq Flat button on IR remote to reset this)
Load: Connected to right channel amplifier output

Procedure

Set volume on unit to max by rotating the volume control CW until the highest LED is lit.

(P/F) The residual noise floor should be <1mV.

Values to be recorded

		Value	Pass Range
12a.	Noise Right Amp		<1mV

At this point the load can be removed from the device under test.

13. A/V Switching Tests

13.1. Sources DVD1, DVD2, AUX1, AUX2

Setup

Signal generator = 350mVAC, Sine, 1kHz
Signal input = DVD1, left channel RCA input
Power state of unit: ON
Selected source on unit: DVD1
Volume on unit: MAX (highest volume LED lit).
Bass/Treble on unit = flat (use Eq Flat button on IR remote to reset this)
Composite Video Source: DVD1 RCA input
Composite Video Display: Video RCA output

Procedure

(P/F) The reading on the left line output RCA connector should be 1.1VAC +/- 0.1V
(P/F) The video display should be displaying the video source. Check for a clean, crisp image with all colours present.

Attach the signal generator to the DVD1 right channel RCA input, and measure the level from the right line output RCA connector.

(P/F) It should be 1.1VAC +/- 0.1V

Repeat for inputs DVD2, AUX1 and AUX2, testing L+R audio channels and video switching.

Values to be recorded

	Value	Pass Range

13a.	A/V Test DVD1		Pass
13b.	A/V Test DVD2		Pass
13c.	A/V Test AUX1		Pass
13d.	A/V Test AUX2		Pass

13.2. Sources AUX3, AUX4, PC1, PC2

Setup

Signal generator = 350mVAC, Sine, 1kHz
Signal input = AUX3, left channel RCA input
Power state of unit: ON
Selected source on unit: AUX3
Volume on unit: MAX (highest volume LED lit).
Bass/Treble on unit = flat (use Eq Flat button on IR remote to reset this)
RGBHV Video Source: AUX3 15p input
RGBHV Video Display: Video 15p output

Procedure

(P/F) The reading on the left line output RCA connector should be 1.1VAC +/- 0.1V
(P/F) The video display should be displaying the video source. Check for a clean, crisp image with all colours present.

Attach the signal generator to the AUX3 right channel RCA input, and measure the level from the right line output RCA connector.

(P/F) It should be 1.1VAC +/- 0.1V

Repeat for inputs AUX4, PC1 and PC2, testing L+R audio channels and video switching.

Values to be recorded

		Value	Pass Range
13e.	A/V Test AUX3		Pass
13f.	A/V Test AUX4		Pass
13g.	A/V Test PC1		Pass
13h.	A/V Test PC2		Pass

14. Mix Inputs

Setup

Signal generator = 440mVAC, Sine, 1kHz
Signal input = Mix left channel RCA input
Power state of unit: ON
Selected source on unit: OFF
Volume on unit: MAX (highest volume LED lit).
Bass/Treble on unit = flat (use Eq Flat button on IR remote to reset this)

Procedure

The mix volume is independent of the front level volume control.

(P/F) The output level from the left output RCA should be 1.1VAC +/- 0.1VAC

Change the signal generator input to the right mix RCA input.

(P/F) The output level from the right output RCA should be 1.1VAC +/- 0.1VAC

Values to be recorded

		Value	Pass Range
14a.	Mix Input - Left		1.0 – 1.2VAC
14b.	Mix Input - Right		1.0 – 1.2VAC

[Setup for next test] Set the frequency back to 1kHz.

15. Non-Volatile Memory Setting

Procedure

Ensure power to the unit is ON. Press the power button so that the unit is ON and active.
Select source DVD1.
Remove mains power (without pressing the power button).
Reapply mains power.

(P/F) The unit should come back up in power ON mode, with DVD1 selected.

Values to be recorded

		Value	Pass Range
15a.	NV Memory Test		Pass

16. Final check for damage

Disconnect from test bench and inspect for scratches on external paint.

17. Factory setting

Set up the unit for default factory setting as below:

With power to the unit ON,
Select source DVD1,
Set the volume to the LED just to the right of vertical at the top of the knob.
Select source OFF.
Press the power button to turn power OFF.

Disconnect mains power.

Attach tested sticker.

LISTENING TEST

REQUIREMENTS FOR LISTENING TEST SETUP:

a) CD Player
b) 2x Speakers

18. Listening Test

Connect unit to mains power (240VAC).
Connect the CD Player to source DVD1.
Connect speakers to L and R amplifier outputs.

18.1. Switch on thump

Upon switch ON, ensure that thump is of reasonably low level.

18.2. Audio quality

Select source DVD1. Ensure that the audio is of crisp, clean sound with no audible distortion artefacts. Repeat this test for all audio inputs, including the mix inputs.

18.3. Control Input Fading

Select source DVD1 and ensure the CD player is connected to the DVD1 inputs on the rear of the unit. On the rear panel of the unit, ground input L1. The volume of the audio playing should ramp down smoothly. Unground input L1. The volume of the audio should smoothly ramp back up.

18.4. Bass/Treble

With source DVD1 still selected and audio playing, use the IR remote to increase and decrease the bass and treble. Listen for changes to the bass frequencies (around 100Hz) and the treble frequencies (around 10kHz).

Should any of these listening tests fail the unit should not be passed.